

Researching rhythms of daily life: The role of sleep and daily activity in entraining circadian cycle in persons with dementia

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#DementiaCareSummit

What we know: Disruption in circadian cycle common

- 70% of persons with dementia have sleep-wake disturbance^{1,2}
- Relationship between sleep-wake disturbance and dementia complex and bi-directional³
 - Daytime sleepiness/insomnia & dementia risk = 1.76 (95% CI=1.49–2.02)⁴
 - Sleep apnea & dementia risk = 1.35 (95% CI= 1.11-1.65)⁵
 - U-shaped association with either short (≤ 6 hours/night) or long (≥ 8 hours/night) sleep⁶

What we know:
Multiple potential pathways to
circadian disruption in dementia

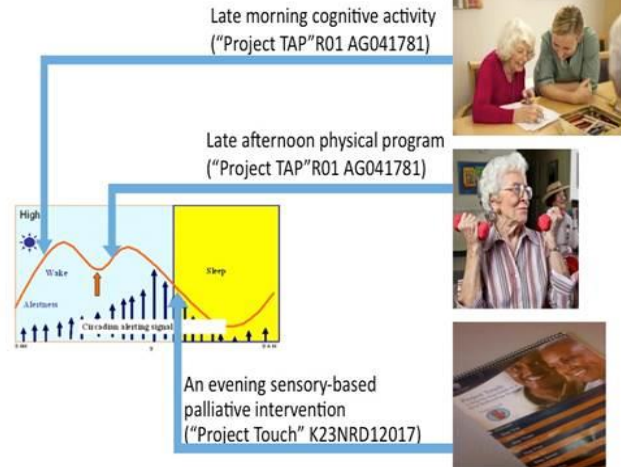
- *Reduced neuronal connectivity in hippocampal area CA1* ⁷
- *Degeneration of suprachiasmatic nucleus* ⁸
- *Accumulation of amyloid β* ⁹
- *Oxidative stress and neuroinflammatory response*¹⁰
- *Cortical thinning/atrophy* ¹¹

What we know:
Mixed evidence for interventions to
entrain “normal” circadian pattern

- *Medical*
 - *Melatonin*^{12, 13}
- *Photic Interventions*
 - *Ambient light interventions*¹⁴⁻¹⁶
- *Non-photic Interventions*
 - *Physical activity*¹⁶
 - *Timed activity*^{17,}
 - *Not tested in dementia: Meal timing*¹⁸

What we don't know: Role of optimally timing activity to entrain circadian patterns

Cognitive activity
*Sustained attention*¹⁹
Physical activity
*Exercise*²⁰
Dance
Sensory/passive
activity
*Music*²¹
*Massage*²¹



The Healthy Patterns Study Protocol
5R01 NR 015226 -02

Gaps in knowledge:

Future research recommended

1. Pathophysiology and biomarkers linking circadian disruption and pathogenesis of dementia
 - Role of circadian changes as marker of early pathogenesis
2. Testing of combinations of photic and non-photic environmental modifications (e.g., lighting, meals, activity)
 - Mechanisms regarding optimal timing
 - Attention to potential for scaling into routine care

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